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Dräger Medical
Information Technologies

Dräger

Saturn User's Guide

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HL7 Scheduling Interface

Installation and Configuration

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Introduction

This section introduces you to the Saturn HL7 Interface.

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Operator's Responsibility for Patient Safety

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The operator of the anesthesia system must recognize that the means of monitoring and discovering hazardous conditions are specific to the composition of the system and the various components of the system. It is the operator, and not the various manufacturers or suppliers of components, who has control over the final composition and arrangement of the anesthesia system used in the operating room. Therefore, the responsibility for choosing the appropriate safety monitoring devices rests with the operator and user of the equipment.

Patient safety may be achieved through a variety of different means depending on the institutional procedures, the preference of the operator, and the application of the system. These means range from electronic surveillance of equipment performance and patient condition to simple, direct contact between operator and patient (direct observation of clinical signs). The responsibility for the selection of the best level of patient monitoring belongs solely to the equipment operator. To this extent, the manufacturer, Draeger Medical, Inc., disclaims responsibility for the adequacy of the monitoring package selected for use with the anesthesia system. However, Draeger Medical, Inc. is available for consultation to discuss monitoring options for different applications.

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What Is the Saturn HL7 Interface?

Draeger Medical's Saturn HL7 Interface provides a scheduling interface between the hospital's information system (HIS) and the Saturn Information System database. This interface processes HL7 data and creates and modifies cases based on the information provided.

This manual provides the installation and configuration instructions for the HL7 interface application as part of a Saturn Information System.

Acronyms Used in This Manual

Table 1-1 outlines acronyms found in this manual.

Table 1-1. Acronyms Used in this Manual

Acronym	Meaning
HIS	Hospital Information System
HL7	Health Level Seven
MLLP	Minimal Lower Layer Protocol, used for sending Hl7 messages via TCP/IP
DMI	Draeger Medical Inc.

Applicable Documents

The following document is applicable to the HL7 interface described in this manual.

Number:	HL7 Standard Version 2.31
Document Name	ANSI/HL7 Version 2.3.1 —1999
Date	April 14, 1999

Operation

The HL7 scheduling interface receives data from the HIS and enters it into Saturn. HL7 scheduling messages can contain the following types of information:

- Schedule for a surgery case
- Patient demographics
- Diagnosis
- Procedure information
- Anesthesia type
- Location scheduling

The information contained within the HL7 scheduling messages is dependent on what is available in the HIS.

Types of Scheduling Messages

There are three types of scheduling messages:

- Create
- Update
- Cancel

When a case is first scheduled in the HIS, a creation message is sent. This causes the case to be created in Saturn. If there are any changes to the case in the HIS, then update messages are sent to inform Saturn about the changes. Finally, if the case is canceled in the HIS, a cancel message marks the case as canceled in Saturn.

Note: The case could be re-scheduled later, which should cause an update message to be sent. This reschedules the case in Saturn. Also, in the event an update or cancel message is received without a previous creation message, the case is created. In the case of a "lone" cancel message received in Saturn, a case is created and then canceled.

The HIS is considered the "master" of the scheduling data. Saturn shows a view of this data. Data received into Saturn via HL7 is read-only. Any changes that need to be made to this data must be made in the HIS. These changes cause an update message to be sent. Saturn makes the changes. Additions to the case are allowed, thus procedures, diagnosis, personal and other information can be added to a case.

Note: These additions occur totally within Saturn. No messages are sent from Saturn to the HIS, with the exception of Acknowledgement messages.

Message Handling for Personnel Resource ID

Staff are located using their personnel ID. If this fails, then they are searched using their name. If that fails, their name is then entered into the Saturn database. If the personnel ID received from the HIS changes, the system reverts to name matching. This is substantially slower than the personnel ID.

The personnel ID (external ID) for a particular staff can be updated via the Saturn List Manager application. If the personnel ID does not change but the name or resource role does, these changes need to be made in List Manager, as the HL7 interface stops matching if the personnel ID is located.

Example HL7 Message

Figure 1-1 shows a sample HL7 message.

```
MSH|^~\&|ORSIS1|NPGENERAL
North|BATCH|NPGENERAL|20010108134503||SIU^S14|WEST1010108134549503|D|2.3|36850||AL|
SCH|124114||||||Elective^^L||120|MIN^MINUTES|^^^200101091130|||||smithl2^Smith^Suzanne
^ ^^||||smithl2^Smith^Suzanne^ ^^|||||
NTE|1||General\S\0|
PID|1|12114^^^WEST1|G43114||Burnbaum^Nat^||99941030|M|||^^^^^||(255)555-
5066||||||||||||||||
PV1|1|O|^23HR|||||||GSU|||||||IP|||||||||||||||||||||||||||||||||
DG1|1|||RENAL DISEASE Comments: END STAGE||W|||||||||||||
RGS|1|A|
AIS|1|A|^Insertion, Audio-Visual Graft - Location: Right Leg bone|200101081130||||||
AIG|1|A|145^Art5|||1|ea|200101081130|||60|MIN^MINUTES|
AIL|1|A|1042^OR 42|OR||200101081130||||||
AIP|1|A|997242^Smith^Roger^Z.^^^|^Anesthesia Staff||200101081130||||||
AIP|2|A|972443^McCoy^Bones^Z.^^^|^Anesthesiologist||200101081130||||||
AIP|3|A|967944^Smith^Sam^Z.^^^|^Assistant 1||200101081130||||||
AIP|4|A|931042^Welby^Marcus^Y.^^^|^Surgeon||200101081130||||||
AIP|5|A|931757^Rachet^Betty^Q.^^^|^Pacu Nurse||200101081130||||||
```

Figure 1-1. Example HL7 Message

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System Data Field Definitions

This section provides a series of tables of the Saturn HL7 system's data field definitions.

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Functional Requirements

The following capabilities and constraints apply to the Saturn HL7 Interface:

- HL7 Version 2.3.1 for Scheduling is supported.
- 'Z' segments are not supported.
- HL7 Minimum Lower Level Protocol (MLLP) is supported. The block bytes are fully configurable.
- HL7 Sequence Numbers are optional. If they are used, the HL7 version 2.3 standard is adhered to.
- The MSH receiving Application and Facility components are checked.
- All messages are acknowledged (ACK) after they have been processed.
- For each update, the entire record must be sent.
- Parent/Child scheduling is not supported.
- Live updates of open cases are not supported. The case must be closed and reopened in order to get the HL7 updated information.
- Patient updates need to be sent as Scheduling updates.
- The HL7 system shall be able to operate on a PC with the following minimum requirements: 400 Mhz Pentium II processor, 256 MB RAM, 750 MB free hard drive space, Windows NT Workstation SP5, TCP/IP network interface.
- The Saturn HL7 interface adheres to the "Auxiliary Application" role. This means that HL7 data is collected passively via unsolicited messages, processing only SIU types. The only messages sent out are general acknowledgements (ACK) in response to unsolicited messages.
- Except where noted, all data received over HL7 is read-only on Saturn.
- The Saturn HL7 engine utilizes the MSHug's ActiveX for Healthcare SDK. Both TCP/IP (Saturn version) and DCOM (MSHUG version) can be used for transports. Other transports can be developed on an as-needed basis.
- The following Scheduling (SIU) messages are supported. Any codes not listed are acknowledged (ACK) but ignored.
  - S12 Notification of New Appointment Booking (Create)
  - S14 Notification of Appointment Modification (Update)
  - S15 Notification of Appointment Cancellation (Cancel)
- If an S12 is received and the case exists in the Saturn system, the case is updated. If an S14 or S15 is received for a nonexisting case, the case is added. Cases are not actually deleted from the system; they are flagged as canceled.

Scheduling Message Format

The following is the HL7 Scheduling message formats that are supported. Each uses a standard layout as specified in the HL7 Version 2.3 documentation.

- MSH
- SCH
- [NTE]
- [{PID
- [PV1]
- [{DG1}]
- }]
- {RGS
- [{AIS}]
- [{AIG}]
- [{AIL}]
- [{AIP}]

MSH Layout

The following is a list of valid segments and fields that are supported. The fields that are extracted by the Saturn HL7 Interface are listed for each segment. All other fields are ignored.

Table 2-1. Saturn Supported Segments and Fields

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
1	Field Separator	1	The field separator character used in the message	<internal>
2	Encoding Characters	4	The component separator, repetition separator, escape character, and sub-component separator	<internal>
3	Sending Application		Used only to send message back	<internal>
4	Sending Facility		<ignored>	<internal>
5	Receiving Application		Used to validate the incoming message. The first component is used	<internal>
6	Receiving Facility		<ignored>	<internal>
7	Date/Time of message		Date and time the message was sent	<internal>
9	Message Type	3^3	Message type and trigger event	<internal>
10	Message Control ID		Unique identifier for the message	<internal>
12	Version ID		2.3	<internal>
13	Sequence Number		Optional – used only if the HL7 sequence number protocol is to be utilized	<internal>

Scheduling Message Layout

The following is a list of valid segments and fields that are supported. The fields that are extracted by the Saturn HL7 Interface have been listed for each segment. All other fields are ignored.

Table 2-2. Scheduling Activity Information Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
1	Placer Appointment ID	75	(Scheduling System's Unique Identifier)	<internal>
9	Appointment Duration	20	(This field must contain a positive, non-zero number)	"Scheduled Case Stop" Event
10	Appointment Duration Units	200	(Default to: 'MIN^MINUTES')	<internal>
11	Appointment Timing Quantity	200	(caseStart date/time) ^^^YYYYMMDDHHMM	"Scheduled Case Start" Event
12	Placer Contact Person	75^25^25^25^15^15^20	ID ^ FamilyName ^ GivenName ^ MiddleName ^ Suffix ^ Prefix ^ Degree	Referring Physician[1]

[1] Added to the site list (staff) table if the entry does not exist.

Notes and Comments Segment

Table 2-3. Notes and Comments Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
3	Comment	30	Anesthesia Description	Anesthesia Primary Type[2]

[2] Added to the anesthesia type list if the entry does not exist.

PID – Patient Identification Segment

Table 2-4. PID — Patient Identification Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
2	Patient ID – External	75	Internal Unique Identifier – Must be present if MRN is not provided	Used to uniquely identify cases
3	Patient ID – Internal	15	Medical Record #	Medical Record Number
5	Patient Name	25^25^25	FamilyName ^ GivenName ^ MiddleName	Patient Name
7	Date Of Birth	8	YYYYMMDD	DOB & Age in Years, Months
8	Sex	1	(F = Female M = Male O = Other U = Unknown)	Sex
11	Patient Address	60^ ^ 20^2^ 10	Street ^ ^ City ^ StateOrProvince ^ ZipOrPostalCode	Address
18	Patient Account Number	20	ID ^	Admission Number
19	SSN – Patient	15	(Social Security #)	SSN

PV1 – Patient Visit Segment

Table 2-5. Patient Visit Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
3	Patient Location	10^10^10	PointOfCare ^ Room ^ Bed	<internal>
18	Patient Type	20	(OP – Outpatient IP – Inpatient 23HR – 23 Hour Observation SDA – Same Day Admission)	Admission Type

DG1 – Diagnosis Segment

Table 2-6. DGI — Diagnosis Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
3	Diagnosis Code	10	(Pre-case diagnosis. Preferably ICD-9 Codes)	Diagnosis[3]
4	Diagnosis Description	255	(String Description)	Diagnosis[3]
5	Diagnosis Date Time	26	YYYYMMDDH-HMMSS	<internal>
6	Diagnosis Type	1	(Default to 'W' <working>)	<internal>

[3] Added without ICD-9 code (as other) if the Diagnosis Code does not exist in Saturn.

RGS – Resource Group Segment

Table 2-7. RGS — Resource Group Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
2	Action	1	A – Add, U – Update, D – Delete	<internal>

AIG – General Resource Segment

Table 2-8. AIG — General Resource Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
2	Action	1	A – Add, U – Update, D – Delete	<internal>
3	Resource ID	75^65	Resource (equipment) ID ^ Resource (equipment) Name	Charge Item
6	Quantity	5	(1 to n)	# of entries to create
7	Quantity Units	200	(Default to 'ea' <each>)	<internal>
8	Start Date Time	26	YYYYMMDDHHMM	Time of Charge
11	Duration	20	(In minutes)	<internal>
12	Duration Units	200	(Default to: 'MIN^MINUTES')	<internal>

AIL – Location Resource Segment

Table 2-9. AIL — Location Resource Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
2	Action	1	A – Add, U – Update, D – Delete	<internal>
3	LocationResourceId	75^20	LocationId^Location Description	<internal>
6	Start DateTime	26	YYYYMMDDHHMM	<internal>
9	Duration	20	(in minutes)	<internal>
10	Duration Units	200	(Default to: 'MIN^MINUTES')	<internal>

AIP – Personnel Resource Segment

Table 2-10. AIP — Personnel Resource Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
2	Action	1	A – Add, U – Update, D – Delete	<internal>
3	Personnel Resource ID	75^25^25^25^15^15^20	Personnel ID ^ Family Name ^ Given Name ^ Middle Name ^ suffix ^ prefix ^ degree	Staff [4,5]
4	Resource Role	^20	Description (SURGEONS, PACU_NURSES, ANESTHESIOLOGISTS, ANESTHETISTS)	<internal>
6	Start DateTime	26	YYYYMMDDHHMM	<internal>
9	Duration	20	(In minutes)	<internal>
10	Duration Units	200	(Default to: 'MIN^MINUTES')	<internal>

[4] Added to the site list (staff) table if the entry does not exist.

[5] Staff entries will be modifiable in Saturn.

AIS – Service Segment

Table 2-11. AIS — Service Segment

Field	*Field Description*	*MaxLen*	*What's Expected*	*Saturn*
2	Action	1	A – Add, U – Update, D – Delete	<internal>
3	Service Identifier	8^255	Procedure ID[6] ^ Procedure Name	Procedures[7]
4	Start DateTime	26	YYYYMMDDH-HMM	<internal>
7	Duration	20	(In minutes)	<internal>
8	Duration Units	200	(Default to: 'MIN^MINUTES')	<internal>

[6] This ID will be a CPT code.

[7] Added as 'other' (free hand) if code is not found.

3

Installing the Saturn HL7 Interface

This section provides step-by-step instructions for installing the Saturn HL7 Interface software.

System Installation

Since the Saturn HL7 Interface adheres to the Auxiliary Application role, it passively receives messages and only generates ACKs in response. The HIS needs to be configured to send scheduling messages using this method. As part of the Saturn HL7 Interface configuration, the TCP/IP port number to which the HIS will connect is required, along with the text that will appear in the receiving application message header text (MSH:5).

Note: When installing this software, ensure that Sybase is not already installed.

Prerequisite

Insert the CD labeled “DMI HL7 System Software” into the CD drive. The first screen shows the HL7 installation starting.

Procedure

1. In the left pane of Windows NT Explorer, double-click the drive containing the HL7 installation software to view its contents in the right pane.
2. In the right pane, double-click the folder **Disk1** to display its contents.
3. In the right pane, double-click the **Setup** file found in the **Disk1** folder. The HL7 Interface Installation Program begins.
4. At the **Welcome Screen**, click **Next** to continue (or **Cancel** to exit the setup).

   Note: If you click **Cancel** to exit any time during Setup, this message appears: “Setup is not complete. If you quit the setup program now, the components you requested to add/remove will not be installed/ uninstalled. You may run the setup program at a later time to complete the operations. Are you sure you want to quit the setup?” Click **Yes** to quit, click **No** to continue setup.
5. When the **Choose Destination Location** window is displayed, do one of the following:
   - Browse to find the desired destination location and then click **Next** to continue.
   - Just click **Next** to accept the default location and continue**. (Next** is the recommended answer.)
6. When the **Setup Type** window is displayed, do any of the following:
   - Click **Next** to accept the default or typical setup type to continue.
   - Click **Back** to return to the previous page
   - Click **Cancel** to exit the setup.

   Note: If for any reason Sybase is installed, an **Information Prompt** appears, informing the user that Sybase is about to be uninstalled. Click **OK** to continue. When the **Confirm Delete** prompt is displayed, click **Yes** to uninstall Sybase or click **No** to skip the uninstall process. (**Yes** is the recommended answer.)
7. When the **Adaptive Server Anywhere Welcome** window is displayed, click **Next** to continue. If for any reason you want to cancel the Sybase installation, click **Cancel. (Next** is the recommended answer.)

Note: If the Sybase installation takes more than 90 seconds, a window is displayed that asks if you are finished installing Sybase. If you are finished, click **Yes.** If not, click **No.** If you select **No**, the next window allows you to finish installing Sybase. To finish installing Sybase, you must switch back to the Sybase install by doing the following:

— Hold the CTRL key and then press the ESC key
— Click the **Sybase** task in the NT task bar

8. When the Sybase installation **Choose Destination Location** window is displayed, click the **Advanced** button.
9. When the Sybase **Location – Details** window is displayed, enter **C:\Sybase\ASA60** in the **Adapter Server Anywhere** window. Then enter **C:\Sybase\Sybase Central** in the **Sybase Central** window. Click **Next** to continue, or click on **Cancel** to stop the installation**. (Next** is the recommended answer.)
10. When the Sybase installation **Setup Type** window is displayed, click **Network Client.** Then do one of the following:
    - Click **Next** to continue (**Next** is the recommended answer).
    - **Back** to return to the previous page
    - **Cancel** to stop the installation.
11. When the Sybase installation **Select Components** window is displayed, select the following check boxes:
    - Check **Adaptive Server Anywhere**
    - Check **Sybase Central**
    - Deselect **jConnect**
    - Check **Help Files** and then click **Change**
12. When the Sybase installation **Select Sub-components** window is displayed, do the following:
    - Check **WinHelp Files**
    - Deselect **HTMLHelp Files**
13. In the Sybase installation **Select Sub-components** window, click **Continue**.
14. When the Sybase installation **Select Components** window is displayed:
    - Click **Next** to continue (**Next** is the recommended answer).
    - Click **Back** to return to the previous page.
    - Click **Cancel** to stop the installation.
15. When the Sybase installation **Select Program Folder** window is displayed:
    - Click **Next** to continue (**Next** is the recommended answer).
    - Click **Back** to return to the previous page.
    - Click **Cancel** to stop the installation.
16. When the Sybase installation **Start Copying Files** window is displayed:
    - Click **Next** to continue (**Next** is the recommended answer).
    - Click **Back** to return to the previous page.
    - Click **Cancel** to stop the installation.

17. When the Sybase installation **Setup Complete** window is displayed**,** deselect the **Yes, I want to view the readme file** check box, and then click the **Finish** button.

18. When the question **Are you finished installing Sybase** appears, click **Yes.**

    Important: If this question is displayed before Sybase is finished being installed, click **No** and switch back to the Sybase installation task.

    Sybase is now installed and MSDE will be installed without any input from the user.

19. When the **Select Program Folder** window is displayed:

    - Click **Next** to continue (**Next** is the recommended answer).
    - Click **Back** to return to the previous page.
    - Click **Cancel** to stop the installation.

20. When the **Start Copying Files** window appears:

    - Click **Next** to begin copying files (**Next** is the recommended answer).
    - Click **Back** to return to the previous page.
    - Click **Cancel** to stop the installation.

21. A **Setup Status Screen** will appear, displaying a progress bar. This bar will indicate the progress of the copy. If Copy tries to copy a “Read Only” file, a message box appears stating, **Read Only File Detected.** Check the **Don’t display this message again** box, and then click **Yes** to copy all read-only files and to continue the copy.

22. The **Sending Application Name** entry window prompts the user for the name of the sending application. Examples of this name are ORSIS1, ANSIS1, and SISGate. After entering the sending application’s name:

    - Click **Next** to continue (**Next** is the recommended answer).
    - Click **Back** to return to the previous page.
    - Click **Cancel** to stop the installation.

23. The **Receiving Application Name** entry window prompts the user for the name of the receiving application. An example of this name is HL7InterfaceApp. After entering the receiving application’s name:

    - Click **Next** to begin copying files (**Next** is the recommended answer).
    - Click **Back** to return to the previous page.
    - Click **Cancel** to stop the installation.

24. The **UNC Name of the Computer** entry window prompts the user with the UNC name extracted from the NT Registry. If this name is correct, you should click on **Next** to continue. Or:

    - Click **Back** to return to the previous page.
    - Click **Cancel** to stop the installation.

25. The **Saturn Database User Name** entry window prompts the user with the UNC name extracted from the NT Registry. If this name is correct, you should click on **Next** to continue**. (Next** is the recommended answer.) Or:

- If this is not correct, enter the correct name and click **Next**.
- Click **Back** to return to the previous page.
- Click **Cancel** to stop the setup.

26. When the **ODBC Data Source Administrator** window appears, click the **System DSN** tab.
27. Double-click **Periopdm**.
28. When the **ODBC Configuration for Adaptive Server Anywhere** window appears, click the **Database** tab.
29. Click the **Server Name** edit box and enter the **Server name.**
30. Click the **Database name** edit box and enter the **Database name**.
31. Click the **Network Tab.** Verify **TCP/IP** is checked and enter **Port=(IP address of the Saturn server)** in the TCP/IP edit box.
32. Click the **Login Tab** and enter **NAD** in the **User ID** box and **NADADMIN** in the **Password** box.
33. Click the **ODBC** tab and click **Test Connection**.
34. Do one of the following:
    - If the connection is successful, click **OK** and go to the next step.
    - If the connection is not successful, contact Saturn Support.
35. Click the **Login Tab** and clear the **User ID** and **Password** boxes (for security reasons).
36. Click **OK** to close the **ODBC Configuration for Adaptive Server Anywhere** window.
37. Click **OK** to close the **ODBC Data Source Administrator** window.
38. Reboot the system. The installation in now completed.

4

Configuring the Saturn HL7 Interface

This section explains how to configure the Saturn HL7 Interface.

Part Number: 4117408-002 Rev: A

System Configuration

This section describes how to configure the Saturn HL7 Interface. It is assumed that the software is already installed, the Saturn server database is reachable, and the Registry items listed below are already populated. All registry items are under the following section: [HKEY_LOCAL_MACHINE\SOFTWARE]

AHC

This section of the registry is used by the MS-HUGs ActiveX for Healthcare SDK. The only things that *may* need to be configured are the UNCs and the TCPIP section.

AHC & AHC.. Applications

This item must be set to the UNC of the computer.

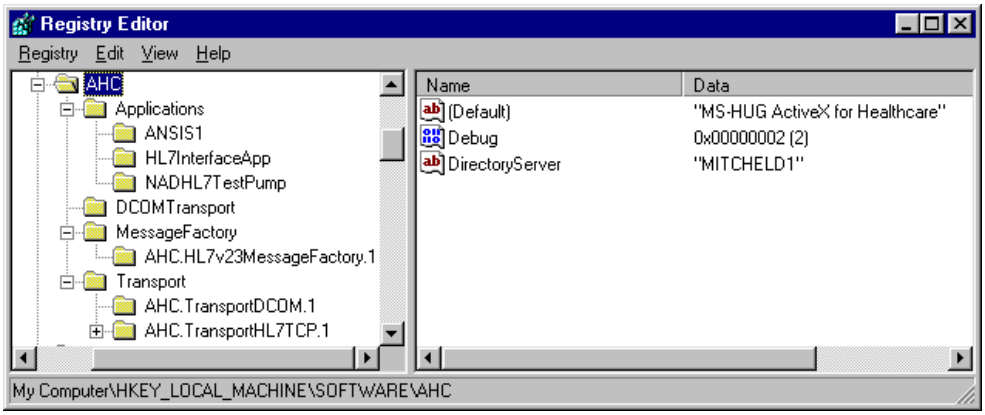

Figure 4-1. Configuring the DirectoryServer (Example Only)

Client and Transport

Under [..\AHC\Applications], there is a list of valid application names. This list represents both the sending and receiving applications. This means there must be an equivalent name for the local application and the remote (sending) application. This information is contained in Field 3 and 5 of the MSH segment.

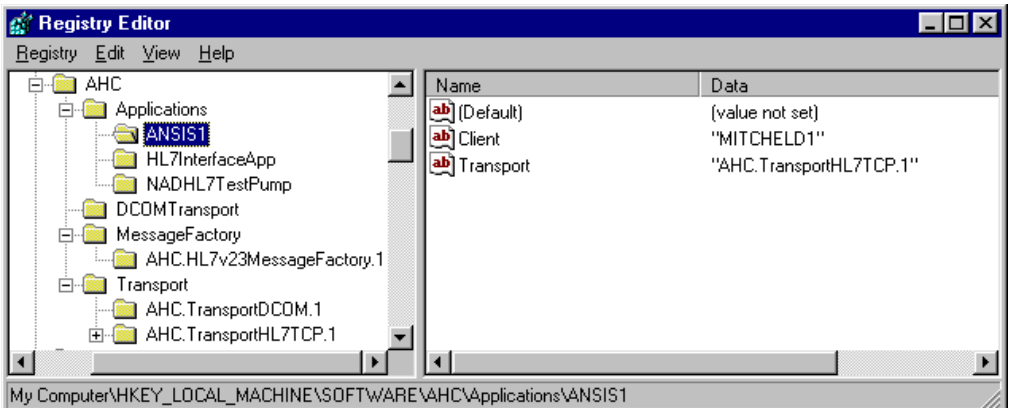

Figure 4-2. Configuring Valid Application Names

Client item must be set to the UNC of the computer. Transport item must be set to 'AHC.TransportHL7TCP.1'. There must be a matching section in the [..\Transport\AHC.TransportHL7TCP.1] for the location application; there does not need to be one for the remote (sending) applications.

AHC..AHC.TransportHL7TCP.1

There must be a matching section for the local application name. There does not need to be a matching section for the remote applications.

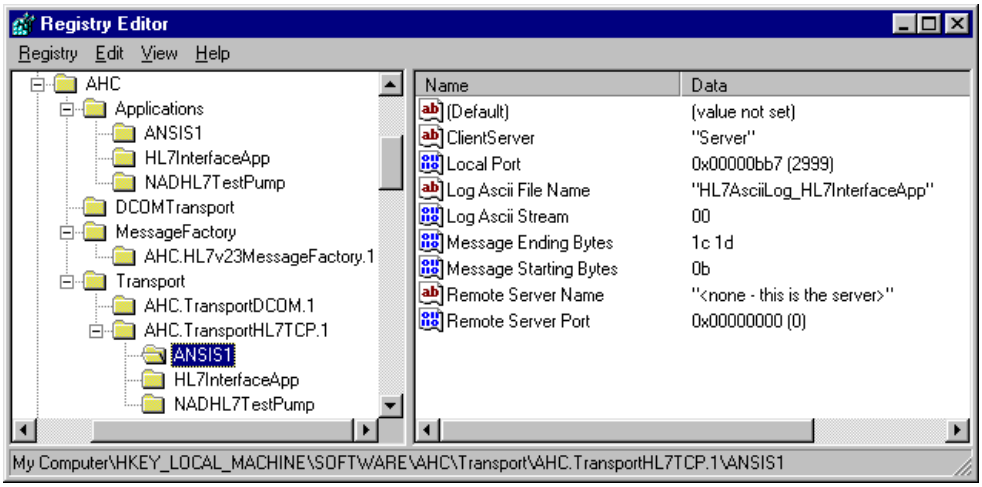

Figure 4-3. .Configuring the TransportHL7TCP.1

Table 4-1. Mapping Local Application Names

Name	Description
ClientServer	Tells the TCP/IP protocol how it should behave. This should be set to 'Server'. 'Client' Connects to remote system 'Server' Waits for remote system to connect Typically sites will set this to Server; the remote HIS will act as a client.
LocalPort	The TCP/IP port that the remote system will connect to. The customer's remote system will need this value.
Log Ascii File Name	If 'Log Ascii Stream' is set to 1, then all TCP/IP data will be logged to file name specified here. This can be very useful when there is a communications problem.
Log Ascii Stream	1 - All TCP/IP data will be logged. 0 - Data will not be logged. Note: never leave this permanently turned on.
Message Ending Bytes	The byte sequence that signals the end of the transmitted message. Must be agreed upon between the two systems. Typically this will be set to the HL7 MPPL specified bytes 0x1c 0x0d
Message Starting Bytes	The byte sequence that signals the end of the transmitted message. This must be agreed upon between the two systems. Typically this will be set to the HL7 MLLP specified byte 0x0b

Table 4-1. Mapping Local Application Names (continued)

Name	Description
Remote Server Name	Ignored if ClientServer is set to 'Server'. Otherwise it's the name or IP address of the remote system to connect to. Typically not required as it is configured as a server.
Remote Server Port	Ignored if ClientServer is set to 'Server'. Otherwise it's the port to connect to on the remote server.

HL7 Interface

This section of the registry is used by the Saturn HL7 interface engine. The General key resides under:

[HKEY_LOCAL_MACHINE\SOFTWARE\NAD\HL7\Hl7DatabaseApp

HL7Database App..General

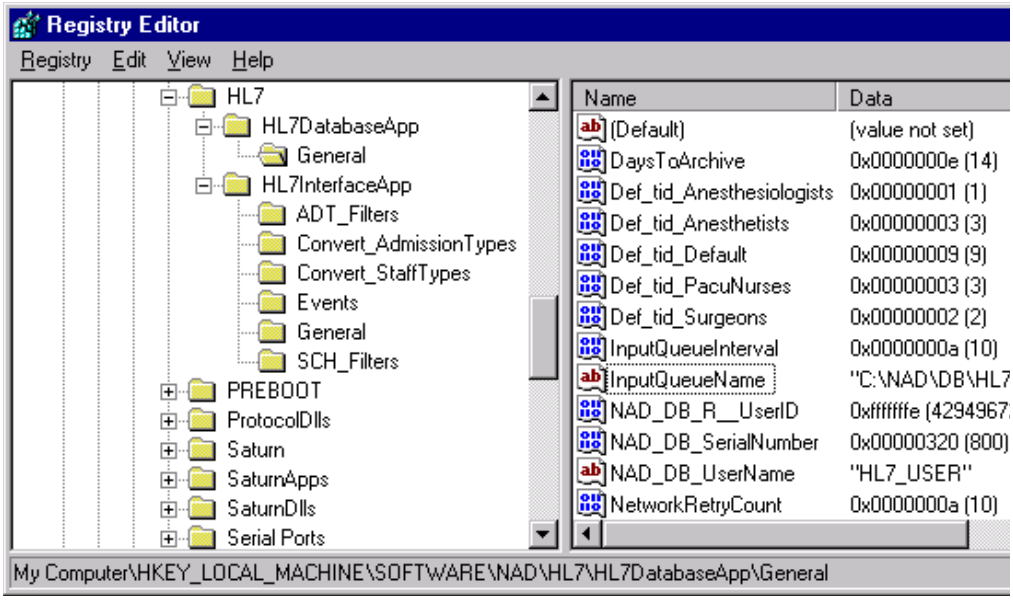

Figure 4-4. Configuring the HL7 Database.

Table 4-2. Configuring the HL7 Database

Name	Description
DaysToArchive	The number of days to hold messages in the HL7DbQueueArchive table before purging them. Determine you holding requirements for archive files.
Def_tid_Anesthesiologists Def_tid_Anesthetists Def_tid_Default Def_tid_PacuNurses Def_tid_Surgeons	Set to 1 Set to 3 Set to 9 Set to 3 Set to 2 *Note:* The default type ID's must match entries in the StaffType table.

Table 4-2. Configuring the HL7 Database (continued)

Name	Description
InputQueueInterval	The number of seconds to poll the queue to see if there are new records to process. Typical value is 10 seconds.
InputQueueName	The queue name from which to read the input data. This should be set to the default: 'C:\NAD\DB\HL7InputQueue'
NAD_DB_R__UserID	The Staff UserID to use as the modified user for all record creations and modifications. This should be set to –2 and there should be an 'HL-7' entry in the staff table with this ID.
NAD_DB_SerialNumber	The SerialNumber in the LocalConfiguration to use when creating Patients and Cases. Normally this is created using the 'CreateUser' procedure in ISQL on the server. See Configuring the Saturn Database for additional details.
NAD_DB_UserName	The user name used to connect to Saturn database. Normally this is created using the 'CreateUser' procedure in ISQL on the server.
NetworkRetryCount	Number of times to retry in the event of a network failure. Typical value is 10.

HL7InterfaceApp ..ADT_Filters

This section is not currently supported. It will be used when ADTs are implemented. It is documented here for completeness.

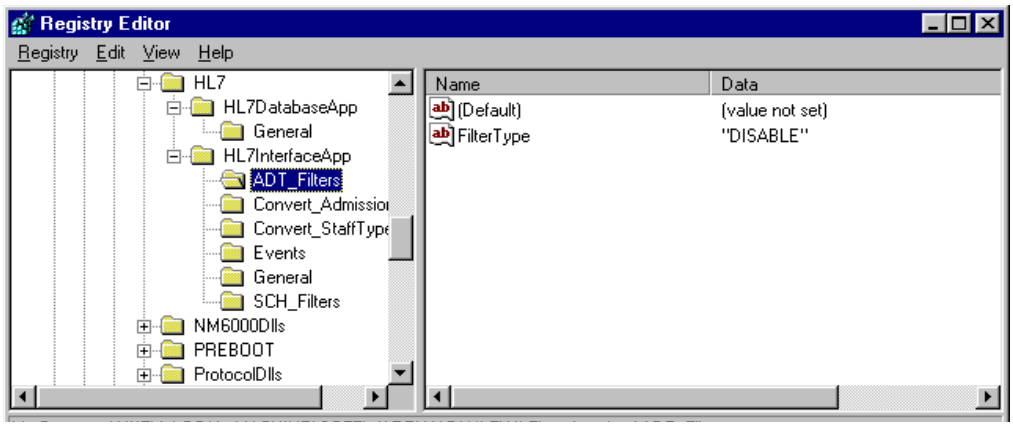

Figure 4-5. Configuring ADT Filters

Table 4-3 lists ADT filter names and provides descriptions.

Table 4-3. Configuring ADT Filters

Name	Description	
FilterType	DISABLE	Filters are not used.
	INCLUDE	Only those listed will be processed
	EXCLUDE	Those listed will not be processed.
Filter<#>	The name should be Filter1, Filter2, etc. The Data should be in the format of **PointOfCare^Room^Bed**. The PV1.Field3 (Patient Location) is compared to the list. Only the length of the supplied string is compared. This means if only PointOfCare is specified in the filter, then all of its rooms and beds would also be filtered.	

HL7InterfaceApp ..Convert_AdmissionTypes

This section is used to map the Admission types from the HIS system to the Saturn system.

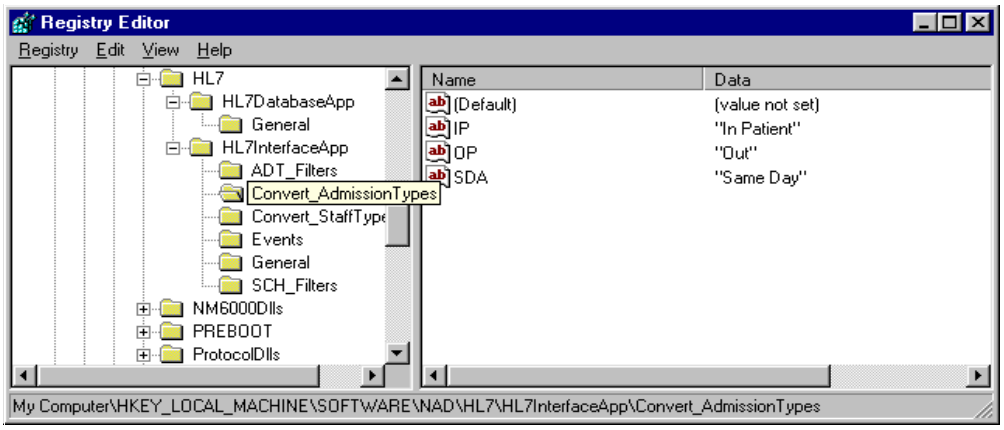

Figure 4-6. Mapping Admission Types

The 'Name' column should contain the strings that will be sent by the HIS in the PV1.Field18 (Patient Type). The 'Data' column should contain the equivalent Saturn admission type.

HL7InterfaceApp ..Convert_StaffTypes

This section is used to map the staff types from the HIS system to the Saturn system.

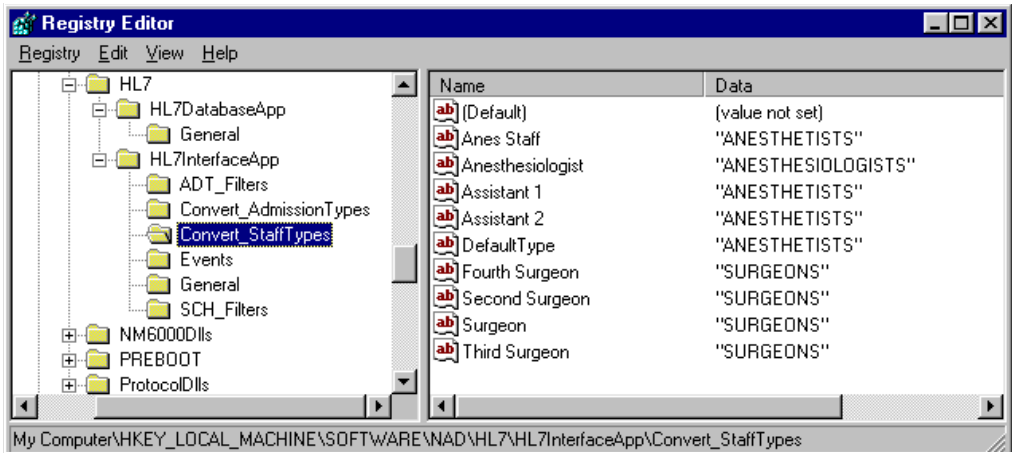

Figure 4-7. Mapping Staff Types

The Name column should contain the strings that will be sent by the remote system in the AIP.Field4 (Resource Role). The Data column should contain the equivalent Saturn staff type. Possible values for Saturn are:

- ANESTHESIOLOGISTS
- ANESTHETISTS
- SURGEONS
- PACU_NURSES

If an error is made when entering this data, it is recorded in the NT Event Log when an HL7 message is processed with the personnel mapped as ANESTHETISTS.

HL7InterfaceApp ..Events

This section is used to map the HL7 message and event codes to a COM interface object.

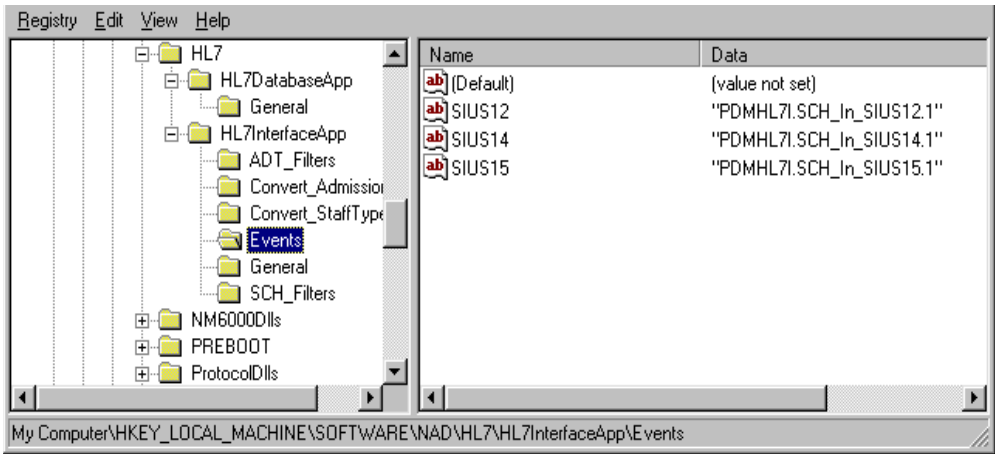

Figure 4-8. Mapping to a COM Interface Object

The Name column contains the HL7 message and event code. This is the same code that is sent in the MSH.Field9 (Message Type) excluding the component separator. The Data column contains the COM string ID of the interface to invoke when the particular message is received.

HL7InterfaceApp ..General

This section is used to configure general HL7 parameters.

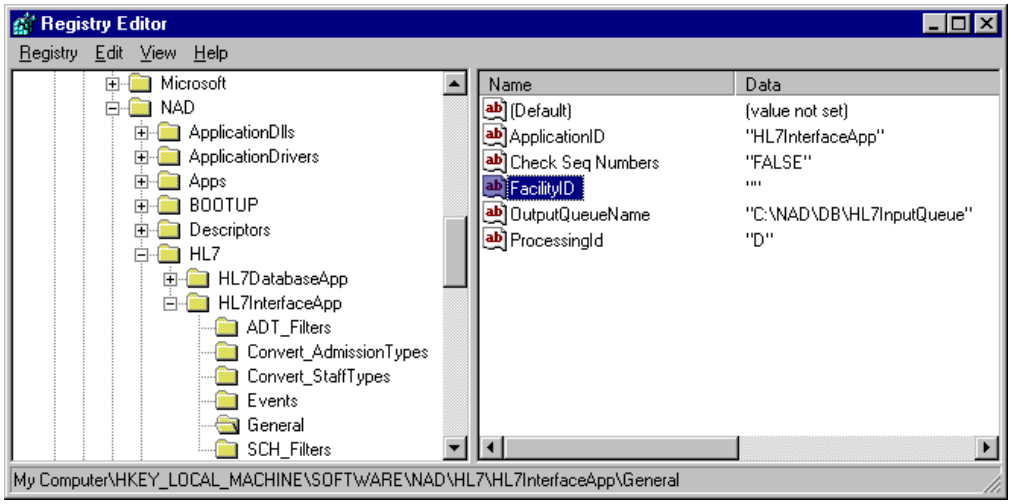

Figure 4-9. Configuring General HL7 Interface Parameters

Table 4-4 on page 4-9 describes the general HL7 interface parameters.

Table 4-4. General HL7 Interface Parameters

Name	Description
ApplicationID	This must be the same as an application name in the [..\AHC\Applications] section and must have a corresponding transport section as well. It must also match the value sent by the remote system in the MSH.Field5 (Receiving application).
Check Seq Numbers	TRUE Sequence numbers are to be utilized. FALSE Sequence numbers will be ignored.
FacilityID	Not used at this time.
OutputQueueName	The name of the queue in which you store the processed data.
ProcessingID	The value to put into MSH.field11. Most of the time this will be 'P', but on a occasion the customer may request 'D' for their test networks. Possible values: 'D' debugging 'P' production 'T' Training

HL7InterfaceApp ..SCH_Filters

When activated, this section allows you to filter scheduling messages. In situations where the HIS is sending out more messages than should be processed, this section can be used to specify which ones should be ignored or processed.

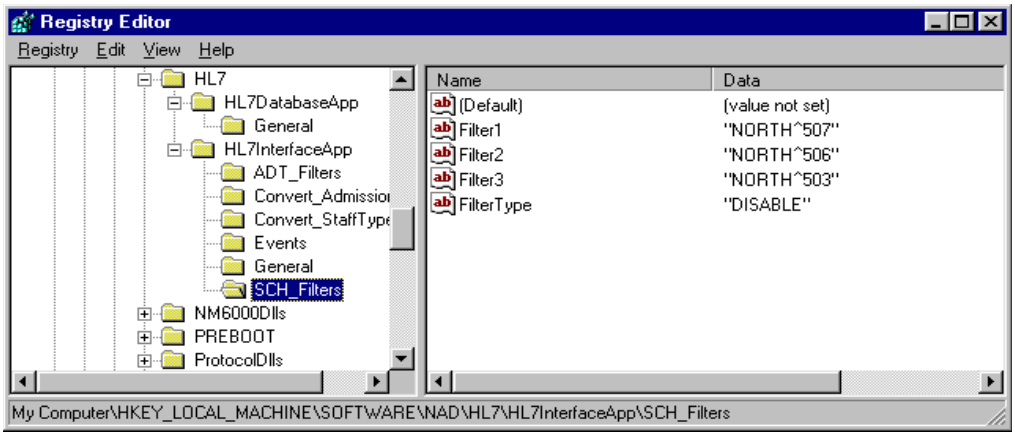

Figure 4-10. Configuring Scheduling Filters

Table 4-5 on page 4-10 describes the available scheduling filters.

Table 4-5. Configuring Scheduling Filters

Name	Description
FilterType	DISABLE Filters are not used INCLUDE Only those listed will be processed EXCLUDE Those listed will not be processed
Filter<#>	The name should be Filter1, Filter2, etc. The Data should be in the format of PointOfCare^Room^Bed. The PV1.Field3 (Patient Location) is compared to the list. They compare only checks for the length of the string. *Example:* This means NORTH^507^3 would be filtered because only the prefix NORTH^507 was specified.

Sequence Numbers

If sequence numbers are activated, then the last received sequence numbers will be stored in a text file in the following location:

NAD\APPS\HL7\ HL7_SEQNUM.TXT

In the event that this number must be reset, perform the following steps:

1. Shut down HL7InterfaceApp.
2. Edit the above file with Notepad.
3. Enter the new number.
4. Save the file. The new number becomes effective when HL7InterfaceApp is restarted.

Additional Configuration Items

The following procedures are recommended to complete the Saturn HL7 Interface configuration process:

- HL7 Workstation auto-login must be configured (set Autolog)
- HL7InterfaceApp and HL7DatabaseApp must be configured to Auto-run
- Sybase Server must be configured to accept HL7 user connections
- The registry tree structure for AHC and HL7 should be saved and archived at DMI
- The Event Log should be cleared

Set Autolog – HL7 Workstation auto-login must be configured

Perform the following steps to configure the HL7 Workstation auto-login.

1. Click **START>FIND>FILES** or **FOLDERS**.
2. Enter **autolog*** in the named field.
3. Find autolog.exe.
4. Double-click **autolog.exe** to launch the AUTOLOG utility.
5. Enter the appropriate password.
6. Click **OK**.
7. When the Autolog Enabled dialog box appears, click **OK**.
8. Click **Start** > **Shutdown** on the task bar.
9. Choose **Close all programs and log on as different user** to test autolog.
10. Click **Yes**.
11. If autolog was configured properly, the system logs on and the **Welcome to Windows NT** window appears.
12. Deselect the **Show this Window Screen next time you start Windows NT** option**.**
13. Click the **Close** button.
14. For the Internet Explorer window, deselect the **Show this next time you log in** option**.**
15. Click the **Close** button.

HL7InterfaceApp and HL7Database App Must Be Configured to Auto-run

The HL7 applications must be placed in the Windows NT system **Startup** folder so they are automatically executed when the system is started.

To start a program each time Windows NT starts, do the following:

1. Click **Start**, and then point to **Settings**.
2. Click **Taskbar**, and then click the **Start Menu Programs** tab.
3. Click **Add**, and then click **Browse**.
4. Locate the program you want to start, and then double-click it.
5. Click **Next**, and then double-click the **StartUp** folder.

6. Type the name that you want to see on the StartUp menu, and then click **Finish**.
7. If Windows NT prompts you to choose an icon, click one, and then click **Finish**.

Sybase Server Must Be Configured to Accept HL7 User Connections

Perform the following to configure the Sybase Server to accept HL7 user connections.

1. A unique user must be created on the server that matches the [HL7DatabaseApp..General/NAD_DB_UserName] key. 'CreateUser' should be used to do this inside of Sybase on the server.
2. Use Sybase Central on the Sybase Server (the system providing database services).
3. Open **Interactive SQL** (ISQL) on the appropriate database.
4. Enter "CreateUser *username, userid*" where *username* is the UNC name of the HL7 PC, and the *userid* is a unique 3-digit number.
5. Exit Sybase Central.

The Registry Tree Structure for AHC and HL7 Should Be Saved and Archived at DMI

Perform the following to save and archive the registry tree structure for AHC and HL7.

1. Click **START > RUN**.
2. Enter "regedit" in the text box and click the **OK** button.
3. Locate [HKEY_LOCAL_MACHINE\SOFTWARE\AHC].
4. On the tool bar, click **Registry > Export Registry File**.
5. Enter the desired location and file name and then click **Save**.
6. Locate [HKEY_LOCAL_MACHINE\SOFTWARE\NAD\HL7].
7. On the tool bar, click **Registry > Export Registry File**.
8. Enter the desired location and file name and then click **Save**.

The Event Log Must Be Cleared

Perform the following to clear the event log.

1. Select **Start > Programs > Administrative Tools > Event Viewer** from the taskbar.
2. Select **Log > System** from the menu.
3. Select **Log > Clear All Events** from the menu.
4. Click **No** to save the Event log.
5. Click **Yes** to clear the System log.
6. Select **Log > Security** from the menu.
7. Select **Log > Clear All Events** from the menu.
8. Click **No** to save the Event log.
9. Click **Yes** to clear the Security log.

10.Select **Log > Application** from the menu.

11.Select **Log > Clear All Events** from the menu.

12.Click **No** to save the Event log.

13.Click **Yes** to clear the Application log.

14.Close the Event Viewer window.

5

Operation and Troubleshooting

This section describes required daily tasks and provides troubleshooting instructions.

System Operation

Each day the system should be checked for errors in the following locations:

- NT Event Log on the HL7 PC
- Error Queue
- Free space on the hard drive

Troubleshooting

The system is designed in two parts.

- HL7InterfaceApp
- HL7DatabaseApp

The Saturn HL7 interface application is responsible for receiving HL7 messages over a TCP/IP socket connection from the HIS to an HL7 queue. The database application is responsible for removing messages from the HL7 queue and loading them into the Saturn database.

The HL7InputQueue database is built using an MSDE database. There are three primary tables:

- HL7DbQueue
- HL7DbQueueArchive
- HL7DbQueueError

HL7DbQueue Table

Messages processed by the interface application are placed in the HL7DbQueue table. Filtered messages or event types that are not supported are discarded by the interface application. The database application reads the queue in a FIFO fashion and retrieves the oldest message first, which is then loaded into the Saturn database.

HL7DbArchive Table

After a message is successfully loaded into the database, it is moved to the HL7DbArchive table. This table archives all messages processed by the system and provides an audit trail of system activity.

HL7DbQueue Error Table

If there is a problem loading a message into the database, the message is placed in the HL7DbQueueError table. This table contains all messages that have major problems with loading them into the Saturn database.

Messages in the archive queue are kept for a programmable number of days before they are deleted. Typically the DaysToArchive registry value is set to 14, keeping messages for two weeks before purging them from the system. Setting this number too large causes the queue to consume large amounts of disk space and causes performance issues with processing messages from the tables.

All three tables have the same structure. There are nine columns defined as:

- dwIndex
- dblTime
- szExtIdentifier
- enType
- enAction
- dwLength
- Data
- SzOrigMsg
- TmEvent

Most of these columns are used internally by the Saturn HL7 applications, but a few can be useful in troubleshooting problems.

dblTime — This is the time that a message was received by the interface. Note this time format is UTC (Universal Time Coordinate), so you will need to add or subtract an appropriate amount of time to convert it to local time.

szExtIdentifier — This is the external ID associated with a message tying a message to a case in the Saturn system.

szOrigMsg — This contains the text of the original HL7 message exactly as it was received by the interface application. This can help troubleshoot formatting, transmission, syntax and other problems.

tmEvent — This is the time that the message was placed in that table in local time. This is updated as a message is moved from one table to another. Thus, when a message is moved into the archive table, this time is updated and reflects when the message was loaded into the Saturn database. This can be helpful in coordinating message movement with other events occurring in the system.

Accessing the Tables

Accessing the tables is done via OSQL. OSQL allows connecting to a SQL database and issuing SQL queries against it. To connect to the MSDE queue via OSQL, at a DOS prompt type:

```
OSQL –Usa –Pnadadmin
```

Table 5-1 on page 5-4 lists and describes the applicable SQL statements.

Table 5-1. SQL Statements and Descriptions

Description	SQL Statements
Switch to HL7 database	Use HL7InputQueue Go
View entries in error queue	Select * from HL7DbQueueError Go
Prune select entries from error queue	Delete from HL7DbQueueError where dblTime < '2001-06-01' Go
Count entries in archive queue	Select count(*) from HL7DbQueueArchive Go

Program Log Messages

Log messages/events are placed in the NT Event log. These messages contain information pertaining to HL7 message processing, HL7 queue access and/or Saturn database issues.

6

Saturn Database Configuration

This section explains how to configure the Saturn database.

Saturn Database Configuration 6-2

Saturn Database Configuration

Look in the LocalConfiguration table to find the next available SerialNumber_int. Run the following stored procedure using this number:

Exec CreateUser 'MACHINE_NAME', 'XXXX";
Commit

where MACHINE_NAME is the UNC name of the computer and XXXX is the next available number in the LocalConfiguration. Ensure that the number selected matches the number stored in the registry at:

HKEY_LOCAL_MACHINE\SOFTWARE\NAD\HL7\HL7Database App\General\NAD_DB_SerialNumber

Note: The default number from the installation is 800.

In the Staff_tid table:

Staff_tid = -1 and StaffType_str = 'HL-7'

In the Staff table:

Staff_id = –2

Note: This is –2 for historical reasons, however it can be any valid value.

First Name: HL-7
Last Name: HL-7

The following three columns (Table 6-1 on page 6-3) in the SystemConfiguration control the read-only aspects of HL7-populated fields in the Recorder application. In general, all fields that HL7 populates should be read-only. Scheduling information that Saturn receives from the HIS is "owned" by the HIS. Any changes to the scheduling information should originate from the HIS, which will send an update message to Saturn.

Table 6-1 shows the parameters for database configuration in the SystemConfiguration table.

Table 6-1. SystemConfiguration Table

Columns:	
InstallOptions_wrd	This is set to 1 to mark that HL-7 is installed
PatientInfoProtect_wrd	Bit field showing patient fields that are read- only
CaseInfoProtect_wrd	Bit field showing case fields that are read-only
PatientInfoProtect_wrd bit field:	
HL7_PATIENTID_MASK =	0x00000001
HL7_FIRSTNAME_MASK =	0x00000002
HL7_MIDNAME_MASK =	0x00000004
HL7_LASTNAME_MASK =	0x00000008
HL7_BIRTHDATE_MASK =	0x00000010
HL7_DOB_AGE_PROC_DATE_MASK =	0x00000020
HL7_SEX_MASK =	0x00000040
HL7_ADMISSIONID_MASK =	0x00000080
HL7_AKANAME_MASK =	0x00000100
CaseInfoProtect_wrd bit field:	
HL7_PACU_NURSE_MASK =	0x00000001
HL7_ANESTHESIOLOGIST_MASK =	0x00000002
HL7_ANESTHETIST_MASK =	0x00000004
HL7_SURGEON_MASK =	0x00000008
HL7_PROCEDURE_MASK =	0x00000010
HL7_DIAG_MASK =	0x00000020
HL7_ANESTYPE_MASK =	0x00000040
HL7_CHARGES_MASK =	0x00000080

Note: When updating the fields in the SystemConfiguration table the LastUpdate_stp field must also be updated to allow the table to be replicated to the workstations. The replication cycle is approximately every two minutes.

Example: To make all fields read-only, execute the following SQL statement against the Saturn database:

```
Update SystemConfiguration set InstallOptions_wrd=1,
PatientInfoProtect_wrd = 511, CaseInfoProtect_wrd = 255,
LastUpdate_stp=GetDate()
Commit
```

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